

Oniscoidea (Crustacea: Isopoda) from Rottnest Island, Western Australia

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Abstract

Eleven species of Oniscoidea are recorded from Rottnest Island and notes on their distributions are provided. Seven species, including three of Palaeartic origin, represent new records for the island.

Two of the Palaeartic species, *Halophiloscia couchi* and *Porcellio lamellatus*, are recorded from Australia for the first time. The possible transfer of other Palaeartic species to Rottnest Island is discussed.

Introduction

During 1980, a study of island biogeography of terrestrial Isopoda (Suborder Oniscoidea) was made on small, limestone islets and stacks around Rottnest Island. These islets provide an excellent system for the investigation of various aspects of insular biogeography and they have been used in studies of plants (Abbott 1977; Abbott and Black 1980) and lizards (Coster 1977).

Prior to this study at least four different species of Oniscoidea have been recorded from Rottnest Island. *Buddelundia cinerascens* Budde-Lund, *Deto* sp. and *Philoscia* sp. were recorded by Budde-Lund (1912). Wahrberg (1922) recorded *Deto marina* (Chilton) and *Laevophiloscia perlata* Wahrberg. *Haloniscus searlei* Chilton was reported from salt lakes on the island by Ellis and Williams (1970). Although terrestrial isopods form a common element of the invertebrate ground fauna, they have received little attention in Western Australia. Much of the published information is in papers by Budde-Lund (1912), Wahrberg (1922) and Vandel (1973). These comprise mainly descriptions of species and lists of localities, and none is written in English.

The purpose of this paper is to present an updated list of Oniscoidea from Rottnest Island. Details of the distribution of species on the limestone islets and stacks will be published elsewhere.

Methods

Nine visits were made to Rottnest Island, from February to October, 1980. Most of the samples were collected around the rocky shoreline and on beaches but several inland sites, near lakes and swamps, were also sampled. A map of Rottnest Island, showing the sampling locations, is given in Figure 1.

Isopods were collected by hand from beneath rocks, mats of succulent vegetation (predominantly *Rhagodia baccata*, *Threlkeldia diffusa* and *Scaevola crassifolia*) and other cryptozoic refuges. Specimens for identification were preserved in 70% ethyl alcohol. Reference specimens have been lodged in the Western Australian Museum, Perth, and the Tasmanian Museum, Hobart.

Table 1

Species of Oniscoidea recorded from Rottnest Island. Catalogue numbers of specimens lodged in the Western Australian Museum (WAM) are also listed.

Species	WAM No.
Indigenous species	
Family SCYPHACIDAE	
<i>Deto marina</i> (Chilton, 1884)	119/80
<i>Alloniscus (Alloniscus) nicobaricus</i> Budde-Lund, 1885	120-122/80
Family PHILOSCIIDAE	
<i>Laevophiloscia perlata</i> Wahrberg, 1922	123-125/80
<i>Laevophiloscia karrakattensis</i> Wahrberg, 1922	126/80
Family undetermined: close to SCYPHACIDAE and PHILOSCIIDAE	
<i>Haloniscus searlei</i> Chilton, 1920	—
Genus <i>Haloniscus</i> was placed originally in Family Oniscidae <i>s. lat.</i> Due to a restriction of the Oniscidae, the position of <i>Haloniscus</i> needs to be reviewed.	
Family: PLATYARTHRIIDAE	
<i>Trichorhina australiensis</i> Wahrberg, 1922	127-129/80
Family TRACHELIPIDAE?	
An unidentified species	130-131/80
Family ARMADILLIDAE	
Subfamily BUDELUNDIINAE	
<i>Buddelundia cinerascens</i> Budde-Lund, 1912	132-135/80
Introduced species	
Family HALOPHILOSCIIDAE	
<i>Halophiloscia couchi</i> (Kinahan, 1858)	—
Family PORCELLIONIDAE	
<i>Porcellio lamellatus</i> Uljanin, 1875	138/80
<i>Metoponorthus pruinus</i> (Brandt, 1833)	139-140/80

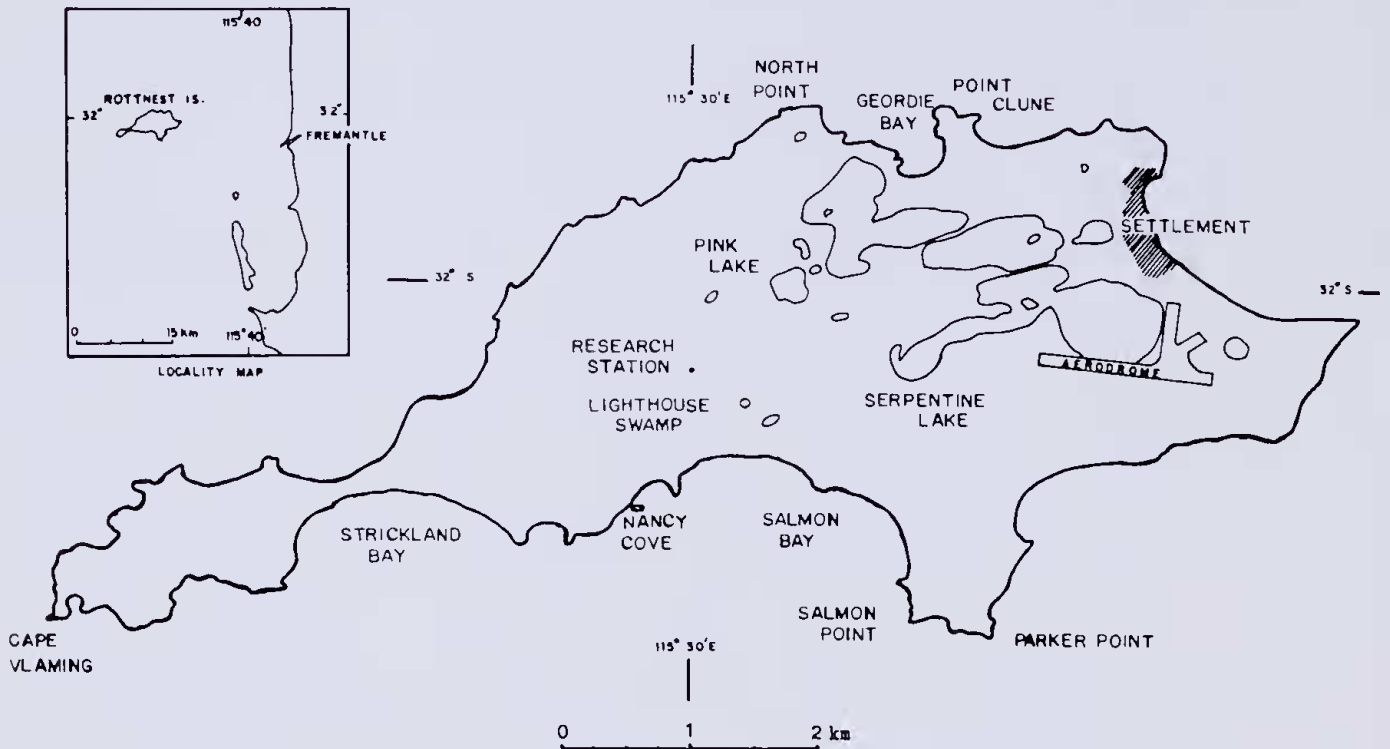


Figure 1.—Sampling locations on Rottnest Island.

Table 2

Distribution of Oniscoidea on Rottnest Island

	Parker Point	Salmon Point	Salmon Bay	Nancy Cove	Strickland Bay	Cape Vlaming	North Point	Geordie Bay	Point Clune	Lighthouse Swamp	Research Station	Pink Lake	Serpentine Lake
<i>Deto marina</i>	*	*	*	*	*	*	*	*	*				
<i>Alloniscus nicobaricus</i>	*	*	*	*	*	*	*	*	*			*	*
<i>Laevophiloscia perlata</i>	*	*	*	*	*	*	*	*	*			*	*
<i>Laevophiloscia karrakattensis</i>	*	*			*	*	*	*	*			*	*
<i>Haloniscus searlei</i>													*
<i>Trichorhina australiensis</i>				*			*						
Trachelipidae? sp.		*	*	*	*	*	*		*				
<i>Buddelundia cinerascens</i>	*	*	*	*	*	*	*	*	*	*		*	
<i>Halophiloscia couchi</i>		*		*	*		*		*				
<i>Porcellio lamellatus</i>			*										
<i>Metoponorthus pruinus</i>	*						*	*	*	*	*		

In the preparation of this paper, the contributions of the two authors were as follows:

Stuart Bunn carried out the field work for the project and assessed the situation on Rottnest Island. Except where stated otherwise, the isopods studied were collected by S. Bunn.

Alison Green identified the specimens and provided information on taxonomic matters and on distributions elsewhere.

Results

Eleven species of Oniscoidea, including three introduced species, were collected from Rottnest Island during the present study (Table 1). The distributions of these species throughout the sampling sites are shown in Table 2.

Indigenous species

Family Scyphacidae

Deto marina (Chilton)

Green (1974, p. 235) reported *Deto marina* as a halophilic species which inhabits stony parts of the supralittoral zone. Recorded from Rottnest Island by Wahrberg (1922, p. 86), *D. marina* has been obtained from "various localities" in Western Australia (Nicholls 1933, p. 128) and on the southern and eastern coasts of Australia, as well as Tasmania. On Rottnest Island the species is abundant in supralittoral habitats, mostly beneath broken rock. In some areas, the island's shoreline consists entirely of vertical cliff faces of weathered limestone and little broken rock material is available. In such

places the species is present infrequently in narrow crevices above the high tide level. At Parker Point, on 23 September 1980, animals were observed beneath rock debris, submerged in tidal pools.

Alloniscus (Alloniscus) nicobaricus Budde-Lund

Budde-Lund (1912, p. 40) identified isopods from North Fremantle, W.A., as *Alloniscus nicobaricus* Budde-Lund, 1885. Specimens of *Alloniscus* found on Rottneest Island are likely to be conspecific with the former animals. Arcangeli (1960, p. 40) divided the genus *Alloniscus* into two subgenera and included *A. nicobaricus* in the subgenus *Alloniscus*. The specimens from Rottneest Island also belong to this subgenus. They agree with Budde-Lund's (1885, p. 226) description of *A. nicobaricus*; however, the latter is brief and it might apply to more than one species.

In the present paper, Budde-Lund's use of the name, *A. nicobaricus*, for the species of *Alloniscus* collected at North Fremantle, will be followed. However, it is not taken for granted that these isopods from southern Western Australia are conspecific with the type material of *A. nicobaricus* from the Nicobar Islands. A comparison of specimens from the two localities would be of interest. *A. nicobaricus* has not been recorded from other parts of Australia.

In this survey of Rottneest Island, *A. nicobaricus* was found in pockets of soil in the rocky, supralittoral zone and beneath rock slabs higher on the marine shore. It was also collected on the shores of Pink Lake and Serpentine Lake. The latter is in the centre of the island and its water is strongly hypersaline.

Family Philosciidae

Laevophiloscia perlata Wahrberg

L. perlata is endemic to Western Australia; it has been recorded from 14 localities, including Rottneest Island, by Wahrberg (1922, p. 126), and from Pelican Point, Crawley, and Walpole Inlet by Bowley (1935, pp. 58, 60). In the present study it was found in the upper supralittoral zone beneath mats of succulent vegetation (in particular, *Scaevola crassifolia*). *L. perlata* is a very agile species which rapidly burrows through loose sand and organic debris when disturbed. Apart from the supralittoral area, it was also found beneath rocks in moist soil near Lighthouse Swamp and Pink Lake.

Laevophiloscia karrakattensis Wahrberg

L. karrakattensis has been recorded previously only from the Perth suburb of Karrakatta (Wahrberg 1922, p. 130). On Rottneest Island it was found in similar microhabitats to *L. perlata*.

Family undetermined (close to Scyphacidae and Philosciidae)

Haloniscus searlei Chilton

H. searlei was found submerged in the hypersaline water at the edge of Serpentine Lake. It has been recorded previously from Government House Lake, and five other localities on Rottneest Island, by Ellis and Williams (1970, p. 52). *H. searlei* also occurs in salt lakes in South Australia, Victoria and Tasmania.

Family Platyarthridae

Trichorhina australiensis Wahrberg

T. australiensis was recorded by Wahrberg (1922, p. 189) from Woorloo and Gooseberry Hill, W.A. This species was collected at Blackwall Reach, Perth, W.A., in 1973, by Mrs J. Lowry (Green unpub. data) but it has not been found beyond Western Australia. *T. australiensis* seems to have a limited distribution on Rottneest Island (Table 2). However, its small size (4.5 mm or less) makes it difficult to detect so the actual distribution may be greater.

Family Trachelipidae?

An unidentified species

An unnamed oniscoid species was found beneath rocks and mats of vegetation, high on the shore of Rottneest Island. This is probably conspecific with one of the species present in Tasmania, which Green (1974, p. 232) referred to Family Trachelipidae. Other examples of what is thought to be the same species have been collected on 14 islands in the Furneaux and Kent Groups, Bass Strait, in 1972-1979, by Mr J. S. Whinray, and in Adelaide and near Moorlands, South Australia, in 1975, by Mr T. N. Petney and Mr C. Wilson respectively (Green unpub. data). In Tasmania and eastern Bass Strait these isopods have been found only near the coast or on islands but they occur further inland in South Australia. The specimens do not correspond with any oniscoid species described from Australia to date.

The unnamed isopods from Tasmania, S.A. and Rottneest Island have been referred, tentatively, to the Trachelipidae because they appear to have pseudotracheae in the exopodites of the pleopods. These isopods have other characters in common with an African genus, *Niambia* Budde-Lund, 1904, which is currently placed in Family Platyarthridae. Members of this family, typically, do not possess pseudotracheae. However, there is some difference of opinion, in literature, as to whether some of the species placed in *Niambia* do or do not have respiratory structures in the pleopods. Further study of the Australian isopods, and of genus *Niambia*, is needed to resolve the present uncertainty. In the mean time, the species found on Rottneest Island will be referred to as Trachelipidae? sp.

Family Armadillidae

Subfamily Buddelundiinae

Buddelundia cinerascens Budde-Lund

B. cinerascens was recorded from Rottneest Island by Budde-Lund (1912, p. 27) and from Carnac Island, W.A., by Wahrberg (1922, p. 231); it has not been recorded elsewhere. This is the only oniscoid species which can readily be located on Rottneest Island during the summer months. It is the only native species, found so far, which is able to conglobate. *B. cinerascens* occurs in cryptozoic retreats throughout the entire island.

Introduced species

The following three species have been introduced to Australia. Their descriptions have been published by Vandel (1962).

Family Halophilosciidae

Halophiloscia couchi (Kinahan)

H. couchi is a halophilic species which occurs on marine coasts and on the shores of brackish waters. It has a wide distribution in Europe, Asia Minor, North Africa and on North Atlantic islands (Vandel 1962, p. 480). It has been introduced to Virginia, U.S.A., and Bermuda (Schultz 1972, p. 86) and to Argentina (Reca 1972, p. 407). The species has not been recognized previously in Australia. In this study *H. couchi* was found amongst rock rubble in the supralittoral zone. The first collection was made at Strickland Bay, in early August, 1980.

Family Porcellionidae

Porcellio lamellatus Uljanin

P. lamellatus is a Palaearctic species which has not been recorded previously from Australia. It is native to the Mediterranean and Black Sea shores, the Atlantic shores of Spain and Portugal, and to some North Atlantic islands (Vandel 1962, p. 744). *P. lamellatus* has been introduced to Cuba and Bermuda (Schultz 1972, p. 93), Argentina (Reca 1972, p. 409) and Saint Helena (Vandel 1977, p. 393). According to a key constructed by Vandel (1962, p. 742), the specimens from Rottneest Island belong to subspecies *lamellatus*, form *oceanicus*. *P. lamellatus* is a halophilic species which remains near the coast. On Rottneest Island one small population was found at Salmon Bay, on 6 May 1980, on the sandy beach beneath rocks.

Metoponorthus pruinus (Brandt)

M. pruinus, a Palaearctic species which is now cosmopolitan, has been recorded from 15 localities in Western Australia (Budde-Lund 1912, p. 39; Wahrberg 1922, p. 157; Vandel 1973, p. 16). It also occurs in South Australia, New South Wales, Queensland and the Northern Territory. Its distribution on Rottneest Island coincides closely with human habitation. On the shore *M. pruinus* was found beneath rock slabs on sandy beaches. It has been recorded from similar situations in Bermuda (Schultz 1972, p. 91).

Discussion

Many of the species recorded in the present study are not common in cryptozoic retreats during the harsh summer conditions. In February and early March *Buddelundia cinerascens* was the only species easily located. Some specimens of *Laevophiloscia perlata* and *Metoponorthus pruinus* were also taken at this time, but only from microhabitats in damp soil near Lighthouse Swamp. By May, all but one of the recorded species were present; *Halophiloscia couchi* was first located in early August. During the cooler months, from May to September, most species of terrestrial Isopoda were readily found in their cryptozoic microhabitats.

In *Buddelundia cinerascens* there are pseudotracheae in the exopodites of the 1st-4th pairs of pleopods (the 5th pleopods are hidden and lack pseudotracheae). The 2nd-4th exopodites are grooved so that they and the 1st exopodites fit together instead of loosely overlapping each other, as is the case in other Oniscoidea. This unusual adaptation of the respiratory organs may be related to the tolerance of drier conditions by *B. cinerascens*.

Most of the oniscoid species require a cool, moist microhabitat, especially those, such as *Deto marina* and *Alloniscus nicobaricus*, which rely on branchial respiration by the pleopods. Hot, dry conditions would also be particularly harsh for the small isopods such as the Trachelipidae? species and *Trichorhina australiensis*, where a high surface-area-to-weight ratio would imply rapid desiccation. To escape such conditions the isopods presumably migrate from their cryptozoic niches to subterranean ones. Consequently a survey of terrestrial isopods conducted during the summer months would reveal only those species which are adapted to drier conditions.

The low number of species recorded in previous papers cannot be attributed to this seasonal activity. Budde-Lund (1912) reported on isopods from Rottneest Island which were collected during September. Most species of Oniscoidea are abundant at this time. Unfortunately, Wahrberg (1922) did not mention the collecting dates of his specimens from the island.

The three Palaearctic species, which were not represented in previous collections, may have arrived on the island subsequently. The distribution of *Metoponorthus pruinus* closely follows human habitation, occurring notably near the new settlement regions at Point Clune and Geordie Bay, and near Lighthouse Swamp and the Research Station. The other two species are particularly interesting records for Rottneest Island because neither has been recognized previously in Australia.

Three other introduced species are known to occur on the adjacent mainland but they were not collected on Rottneest Island during the present survey. *Porcellio scaber* Latreille, 1804, *Porcellio laevis* Latreille, 1804, and *Armadillidium vulgare* (Latreille, 1804), together with *Metoponorthus pruinus*, are common in damp places in gardens throughout Perth metropolitan area (Bunn unpub. data). The main settlement at Thompson Bay on Rottneest Island was not included in this study and it is possible that these species are present there. If not, their arrival on the island might be expected in the near future, especially with the recent increase of building activity at the new areas of settlement. Materials used for buildings on the island are transported from the mainland.

Specimens of *Armadillidium vulgare* (Family Armadillidiidae), collected at Nedlands on 19 April 1980, represent the first record of this species from Western Australia. *A. vulgare* has been recorded previously from south-eastern Australia and Tasmania.

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